

# Dislocation Of The Epiphysis Of The Distal Phalanx: A Case Report And Treatment With S-Quattro

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## Abstract

Epiphyseal dislocation of the terminal phalanx is a rare injury in children. This injury is also called mallet equivalent injury of which there are four types 1. Type A injuries are seen predominantly in young patients and are usually open injuries that may either be S-H type I or II. In type B injuries a true "Bony Mallet" occurs with a displaced S-H III or IV fracture. Very rarely a type C (epiphysis extrusion from the joint) injury in growing children may be seen. In toddler such injuries may be missed as epiphysis is not ossified. Even rarer is type D fracture that result in separation of the epiphysis and avulsion of the tendon from the bone.

The mechanism of such injuries is usually described as hyper-flexion force and may even involve the nail plate injuries (with and without a nail bed laceration)<sup>2</sup>. Seymour<sup>3</sup> described this angular deformity and advocated conservative approach for minimally displaced fractures. Michakinakis and Vourexaki<sup>4</sup> described a case of completely displaced epiphysis and treated with open reduction.

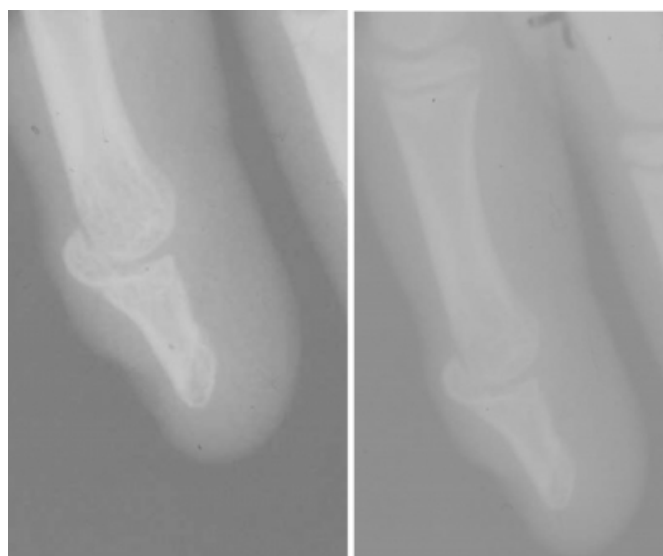
We describe a case of epiphysis dislocation presenting three weeks after the injury that was managed by external fixation (S-Quattro).

## CASE REPORT

A boy aged seven was referred to the senior Author because of an injury he had sustained to his right middle finger three weeks previously. On examination, a swelling was visible on the dorsum of the middle phalanx the finger. The terminal inter-phalangeal joint was held in the flexed position usually seen in an adult mallet finger. Radiographs showed that the epiphyseal plate of the terminal phalanx was totally displaced and was lying on the dorsum of the middle phalanx (Fig.1).

## Figure 1

Figure 1: Pre-operative Radiograph of the type C injury of the epiphysis



At the first operation the joint was distracted using S-quattro for three weeks (Fig. 2). The patient was followed weekly to

check the amount of distraction achieved with a weekly radiograph. At three weeks at second operation the epiphysis was pushed to the space using k-wire as a joy-stick and was reduced closed. After reduction the k-wire was passed from volar to dorsal maintaining desired position. The wire was removed at three weeks. At six weeks the patient achieved full flexion of DIP and had no symptoms. The patient made an uneventful recovery and exhibited full pain-free motion at two years.

**Figure 2**

Figure 2: Post operative distraction with S-quatro



**Figure 3**

Figure 3: Final stabilization with trasarticular K-wire was performed



**DISCUSSION**

Young children cannot give accurate histories and are usually difficult to examine, following injury. Careful examination of the fingers is necessary. The most common mechanism causing a mallet finger deformity is a sudden flexion force applied to the distal inter-phalangeal joint while the extensor tendon is under tension. In adults this usually ruptures the extensor tendon, but in children with a thick epiphyseal plate it may result in separation of the epiphyseal plate through the zone of calcifying cartilage.<sup>5</sup> Rank & Wakefield<sup>6</sup> observed that mallet finger deformity in children is due to forward angulation of the diaphysis on the epiphysis. Salter and Harris<sup>7</sup> pointed out that the flexion deformity was due to the unopposed action of the flexor profundus on the shaft of the bone, whereas the extensor, being inserted into the epiphysis maintains the epiphysis in the extended position.

The rare types of mallet finger (C and D) have been scarcely

reported<sup>8,9</sup> and open reduction was required in the two cases reported in literature so far. It is imperative that lateral radiographs are taken to determine the degree of displacement. Even late reduction of this displacement, resulted in normal growth of the terminal phalanx because the growing cells of the epiphyseal plate remained with the epiphysis even when separation is complete.

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